Summary of Technical Approach- Lower Lost River, California TMDLs

The Analysis Team

U.S. EPA Regions 9 and 10 (located in San Francisco and Seattle) contracted with nationally known TMDL modeling consultants Tetra Tech, Inc. to obtain data analysis and modeling support to assist in developing the TMDLs for dissolved oxygen, pH, and nutrients for Lower Lost River. EPA was assisted by the North Coast Regional Water Quality Control Board, Oregon Department of Environmental Quality, and several other agencies and researchers with experience in the Lost River watershed.

Data Sources Evaluated

EPA and its partners compiled all readily available hydrologic, water quality, and land use data from a variety of published and unpublished sources. The TMDL analysis focused upon 1999 as the "baseline" year because (a) the most extensive data set was available for this year and (b) 1999 was a year in which water quality impairment was particularly pronounced. The analysis also used data from subsequent years (and 2004, in particular) to support model validation. Available data, particularly concerning flows and nutrient loads from agricultural return flows were limited for this analysis, but sufficient water flow and quality data were available to build a reliable water quality model of the system.

Modeling Approach

EPA selected the U.S. Army Corps of Engineers CE-QUAL-W2 (W2) hydrodynamic and water quality model to assist in TMDL development. W2 is a two-dimensional model that simulates water flows and water quality kinetics in complex water body systems such as the Lost River. W2 was selected because it effectively simulates systems that include both slow-moving reservoirs, and faster flowing rivers. Using models such as W2 requires model set up and calibration (to adjust the model so it accurately simulates River flows and quality), followed by validation (a check of the model against different data sets to determine whether it really yields reliable results). The Lost River W2 model was calibrated based principally on data collected in 1999 and validated based on 2004 data.

Key Analysis Findings

- Aquatic algae and plant growth (and associated water quality problems with dissolved oxygen and pH) are controlled principally by the amount of nitrogen compounds in the system. Therefore, the TMDLs focus upon control of nitrogen.
- Reductions in nitrogen and organic matter (BOD) discharges on the order of 50% from 1999 levels will be needed to attain water quality objectives in California.
- Similar reductions in nitrogen and BOD will also be needed in Oregon to enable attainment of California objectives.
- More information about local agricultural return flow volumes and quality would be needed to support calculation of more specific load allocations.

For More Information contact: Gail Louis, USEPA, (415) 972-3467 or louis.gail@epa.gov